Remarks

Applicants thank the Examiner for examining the claims of the present application. Applicants also thank the Examiner for extending the courtesy of a telephone interview. A summary of the March 20, 2007, telephone interview is attached as Exhibit A.

By this amendment, Applicants are amending claims 1 and 15 and adding new claims 37-41. The amendments and new claims are supported in the Specification as filed at, for example, page 18, line 14, to page 19, line 19. With entry of this amendment, claims 1-41 will be pending of which claims 21-26, 28-31, and 34-35 stand withdrawn. Applicants traverse all of the Examiner's rejections and request reconsideration of the application in view of the following remarks.

Independent Claim 1 Is Not Obvious Over *Sheen* In View of *Yukl*

The Examiner rejects claim 1 under 35 U.S.C. § 103(a) as being obvious over Patent No. 5,859,609 ("*Sheen*") in view of U.S. Patent No. 6,057,761 ("*Yukl*"). (Office action at pgs. 4-7.) The Examiner's rejection is traversed.

Solely to expedite prosecution, Applicants have amended independent claim 1. The amendment is not believed to narrow the literal scope of the claim. Amended independent claim 1 recites a system comprising:

> two or more arrays spaced apart from each other to define an interrogation region therebetween, the arrays each being structured to turn about the interrogation region to interrogate a person in the interrogation region with electromagnetic radiation at one or more frequencies in a range of about 200 MHz to about 1 THz to provide corresponding interrogation signals;
>
> one or more processors operable to establish data corresponding to a topographical representation of the person determined from the interrogation signals and generate an output as a function of the data, the topographical representation comprising a plurality of voxels that define a volume of the person in the interrogation region; and
>
> a device responsive to the output to provide an indication to an operator if the person is suspected of carrying one or more concealed objects that pose a threat to security.

Sheen describes a reconstruction algorithm for forming images from data obtained from a section of a 360° cylindrical aperture. (*Sheen*, col. 2, lines 8-21.) The summary of *Sheen*

explains: "Subsets of the 360° data may be used to form images of the target from any cylindrical viewing position or viewing angle. . . . Computer generated animation permits sequential viewing of images incremented by viewing angle. When the increments are small enough, the image will appear that the target is rotating slowly. An operator is then able to fully visually inspect the target for concealed objects." (*Sheen*, col. 2, lines 11-21.)

The section of *Sheen* relied on by the Examiner reiterates that the result of the *Sheen* algorithm is "a single image from a single viewing angle or arc segment of the 360° data." (*Sheen*, col. 9, lines 35-37.) As discussed in *Sheen*, viewing around corners or within depressions of the target is accomplished by reconstructing and viewing images from other arc segments centered at different angles. *Sheen* explains: "For example, for imaging a clothed person, an imaging sequence may use 90° arc segments overlapped in 10° increments, or 0°-90°, 10-100°, . . . , 350°-80°, to form 36 images with illuminations centered at 10° increments." (*Sheen*, col, 9, lines 39-43.) Although the images produced from the *Sheen* reconstruction algorithm can be sequentially viewed, the images in *Sheen* are separate two-dimensional images from separate angles.

By contrast, amended claim 1 recites "one or more processors operable to establish data corresponding to a topographical representation of the person determined from the interrogation signals and generate an output as a function of the data, the topographical representation comprising a plurality of voxels that define a volume of the person in the interrogation region." For example, and referring to FIG. 3 of the present application, the Specification of the present application explains:

> In operation 162, the image data obtained for the circumscribing arc segments S are mapped by processor(s) 44 to a common surface for body B, which [in] turn defines a common volume of body B. . . . Operation 162 provides a topographical representation of body B and the volume bounded by its surface(s) about axis R that are reflective with respect to the electromagnetic radiation used for the interrogations of routine 130.

(Specification, pg. 18, line 14 to pg. 19, line 4.) Further, in one exemplary embodiment described in the Specification:

> In operation 164, one or more images are determined with processor(s) 44 from the topographic representation of body B provided by operation 162. Operation 164 renders one or more two-dimensional images from the volumetric data for body B by performing a two-dimensional parallel ray projection from a desired viewing angle. . . . After attenuation, the maximum voxel intensity is selected to represent

an image pixel intensity for the corresponding ray.

(Specification, pg. 19, lines 5-12.) Thus, the topographical representation (comprising voxels) is distinct from but can be used to generate one or more two-dimensional images (comprising pixels).

Yukl likewise does not teach or suggest "one or more processors operable to establish data corresponding to a topographical representation of the person determined from the interrogation signals . . . the topographical representation comprising a plurality of voxels that define a volume of the person in the interrogation region" as in amended independent claim 1. *Yukl* describes a security system that uses the dielectric response of a subject to microwaves to determine the presence of weapons and contraband. (*Yukl*, abstract.) FIGS. 7A and 7B of *Yukl* show two computer display screens illustrating how contraband on a subject is shown to security personnel through the use of wire-frame human figures. (*Yukl*, FIGS. 7A-7B, col. 8, lines 62-67; col. 9, lines 1-38.) *Yukl* explains that the wire-frame figure is a "generic wire-frame human figure." (*Yukl*, col. 8, lines 62-67; col. 9, lines 1-5.) In fact, *Yukl* emphasizes that "the novel use of generic wire-frame depictions of the human figure avoids privacy-invasive, immodest suggestions of individual physical characteristics of human subjects that are typical of prior art screening systems." (*Yukl*, col. 9, lines 1-5.) Because the wire-frame depiction of *Yukl* is generic and not determined from data obtained from interrogation, *Yukl* also does not teach or suggest "one or more processors operable to establish data corresponding to a topographical representation of the person determined from the interrogation signals . . . the topographical representation comprising a plurality of voxels that define a volume of the person in the interrogation region" as in amended independent claim 1.

Accordingly, neither *Sheen* nor *Yukl* teaches or suggests "one or more processors operable to establish data corresponding to a topographical representation of the person determined from the interrogation signals . . . the topographical representation comprising a plurality of voxels that define a volume of the person in the interrogation regions" as in amended claim 1. Because all claim limitations are not taught or suggested by the prior art, the Examiner's § 103(a) rejection of independent claim 1 should be withdrawn and such action is respectfully requested. (*See* MPEP 2143.04: "To establish *prima facie* obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art.")

Furthermore, although the Examiner suggests that it would have been obvious to combine *Sheen* with *Yukl* to obtain the system of independent claim 1, *Yukl* actually teaches away from the proposed combination. Moreover, the proposed combination would render the *Sheen* imaging system unsatisfactory for its intended purpose.

As stated in the MPEP: "It is improper to combine references where the references teach away from their combination." (MPEP 2145.X.D.2.) Futhermore, "[if the] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." (MPEP 2143.01.)

As noted, *Sheen* describes a reconstruction algorithm for forming an image from data obtained from a section of a 360° cylindrical aperture. (*Sheen*, col. 2, lines 8-21.) *Yukl*, by contrast, distinguishes such imaging systems and explains that "imaging approaches to personnel screening tend to be invasive of a person's privacy and modesty. In other words, screening systems that image the person's body penetrate the person's clothes and highlight the person's physical attributes, effectively undressing the person." (*Yukl*, col. 1, lines 54-57.) To avoid these privacy issues associated with imaging techniques, the systems described in *Yukl* do not perform any imaging, but rather measure the dielectric response of a subject to microwaves. Accordingly, *Yukl* not only teaches away from the imaging techniques of *Sheen*, but uses a different technique for contraband detection such that the combination of the *Yukl* arrays with the *Sheen* imaging system would render the *Sheen* system unsatisfactory for its intended purpose.

Because *Yukl* teaches away from the proposed combination and because the modification proposed by the Examiner would render the *Sheen* system unsatisfactory for its intended purpose, it would not have been obvious to combine *Sheen* with *Yukl* in the manner suggested by the Examiner. (MPEP 2143.01 and 2145.X.D.2.) The § 103(a) rejection of amended independent claim 1 should be withdrawn for this reason as well.

Dependent Claims 2-7, 27, and 37-38 Are Also Allowable

The Examiner rejects dependent claims 2-7 as being obvious over *Sheen* in view of *Yukl*. (Office action at pgs. 4-7.) The Examiner also rejects claim 27 as being obvious over *Sheen* in view of *Yukl* in further view of U.S. Patent No. 5,720,708 ("*Lu*"). (Office action at pg. 7.) The Examiner's rejections are all traversed.

Claims 2-7 and 27 are dependent on amended independent claim 1 and are allowable for at least the reasons stated above with respect to claim 1. Further, claims 2-7 and 27 are each independently patentable because of the unique and nonobvious features of the combinations set forth in each claim.

New dependent claims 37-38 are also dependent on amended independent claim 1 and are allowable for at least the reasons stated above with respect to claim 1. Further, claims 37-38 are each independently patentable because of the unique and nonobvious features of the combinations set forth in each claim. For example, the applied references do not teach or suggest one or more processor operable to "render one or more two-dimensional images from the volumetric data" as in new dependent claim 37.

Independent Claim 8 Is Not Obvious Over *Sheen* In View of *Yukl*

The Examiner rejects claim 8 under 35 U.S.C. § 103(a) as being obvious over *Sheen* in view of *Yukl*. (Office action at pg. 4-7.) The Examiner's rejection is traversed.

Independent claim 8 recites a method comprising:

> providing two or more arrays each shaped to turn about a person positioned between the arrays;
>
> operating the arrays to perform an interrogation of the person with electromagnetic radiation at one or more frequencies in a range of about 200 MHz to about 1 THz;
>
> generating a plurality of image data sets from the interrogation; and
>
> generating volumetric data from the image data sets, the volumetric data being indicative of the surface of the person.

As explained above with respect to claim 1, *Sheen* describes a reconstruction algorithm that produces "a single image from a single viewing angle or arc segment of the 360° data." (*Sheen*, col. 9, lines 35-37.) Computer-generated animation can be performed by sequentially viewing images having incrementally increasing or decreasing viewing angles. (*Sheen*, col. 2, lines 11-21.)

Although the two-dimensional images produced from the *Sheen* reconstruction algorithm can be sequentially viewed, the images remain separate images from separate angles. Thus, "volumetric data . . . indicative of the surface of the person" is not generated from "a plurality of image data sets" as in amended independent claim 8.

The Examiner suggests that column 9, lines 49-56, of *Sheen* teach generating volumetric data from a plurality of image data sets. (Office action at pgs. 7-8.) Applicants disagree. The relevant portion of *Sheen* explains: "Each frame or arc segment reconstruction is computationally intensive. Therefore, high-speed image reconstruction is preferably achieved with high-speed parallel computer processors. To overcome difficulties of shared access to the data that is overlapped by a plurality of parallel computer processors, it is preferred that each arc segment reconstruction is accomplished by a single processor module." (*Sheen*, col. 9, lines 43-50.) Thus, the cited section of *Sheen* only suggests that parallel computer processors be used individually to reconstruct the individual images. There is no teaching or suggestion of "generating volumetric data from the [plurality of] image data sets" as in claim 8.

Moreover, because *Yukl* concerns interrogating a subject with microwave energy and monitoring the dielectric response of the subject instead of imaging the subject, *Yukl* likewise does not teach or suggest "generating a plurality of image data sets from the interrogation" or "generating volumetric data from the image data sets, the volumetric data being indicative of the surface of the person" as in independent claim 8.

Accordingly, neither *Sheen* nor *Yukl* teaches or suggests "generating volumetric data from the image data sets, the volumetric data being indicative of the surface of the person" as in independent claim 8. Because all claim limitations are not taught or suggested by the prior art, the Examiner's § 103(a) rejection of amended independent claim 8 should be withdrawn and such action is respectfully requested. (*See* MPEP 2143.04.)

Furthermore, although the Examiner suggests that it would have been obvious to combine *Sheen* with *Yukl* to obtain the method of independent claim 8, *Yukl* actually teaches away from the proposed combination. (*See* MPEP 2145.X.D.2.) Moreover, the proposed combination would render the *Sheen* imaging system unsatisfactory for its intended purpose. (*See* MPEP 2143.01.)

As noted, *Sheen* describes a reconstruction algorithm for forming an image from data obtained from a section of a 360° cylindrical aperture. (*Sheen*, col. 2, lines 8-21.) *Yukl*, by contrast, distinguishes such imaging systems and explains that "imaging approaches to personnel screening tend to be invasive of a person's privacy and modesty. In other words, screening systems that image the person's body penetrate the person's clothes and highlight the person's physical attributes, effectively undressing the person." (*Yukl*, col. 1, lines 54-57.) To avoid

these privacy issues associated with imaging techniques, the systems described in *Yukl* do not perform any imaging, but rather measure the dielectric response of a subject to microwaves. Accordingly, *Yukl* not only teaches away from the imaging techniques of *Sheen*, but uses a different technique for contraband detection such that the combination of the *Yukl* arrays with the *Sheen* imaging system would render the *Sheen* system unsatisfactory for its intended purpose.

Because *Yukl* teaches away from the proposed combination and because the modification proposed by the Examiner would render the *Sheen* system unsatisfactory for its intended purpose, it would not have been obvious to combine *Sheen* with *Yukl* in the manner suggested by the Examiner. (MPEP 2143.01 and 2145.X.D.2.) The § 103(a) rejection of independent claim 8 should be withdrawn for this reason as well.

Dependent Claims 9-14 and 32 Are Also Allowable

The Examiner rejects dependent claims 9-12, 14 and 32 as being obvious over *Sheen* in view of *Yukl*. (Office action at pgs. 4-7.) The Examiner also rejects claim 13 as being obvious over *Sheen* in view of *Yukl* in further view of *Lu*. (Office action at pg. 7.) The Examiner's rejections are all traversed.

Claims 9-14 and 32 are dependent on amended independent claim 8 and are allowable for at least the reasons stated above with respect to claim 8. Further, claims 9-14 and 32 are each independently patentable because of the unique and nonobvious features of the combinations set forth in each claim.

Independent Claim 15 Is Not Obvious Over *Sheen* In View of *Yukl*

The Examiner rejects independent claim 15 under 35 U.S.C. § 103(a) as being obvious over *Sheen* in view of *Yukl*. (Office action at pages 4-7.) The Examiner's rejection is traversed.

Solely to expedite prosecution, Applicants have amended independent claim 15. The amendment is not believed to narrow the literal scope of the claim. Amended independent claim 15 recites a method, comprising:

> generating electromagnetic radiation at one or more frequencies in a range of about 200 MHz to about 1 THz with two or more arrays to perform an interrogation of a person positioned between the two or more arrays;
>
> moving at least one of the arrays along a path about the person during the interrogation; and

generating volumetric data comprising a plurality of voxels from the interrogation to detect if the person is concealing an object.

As explained above with respect to claim 1, *Sheen* describes a reconstruction algorithm that produces "a single image from a single viewing angle or arc segment of the 360° data." (*Sheen*, col. 9, lines 35-37.) Computer-generated animation can be performed by sequentially viewing reconstructing images that have incrementally increasing or decreasing viewing angles. (*Sheen*, col. 2, lines 11-21.) Although the two-dimensional images produced from the *Sheen* reconstruction algorithm can be sequentially viewed in order to view all angles of a subject, the individual images do not constitute volumetric data. Accordingly, *Sheen* does not teach or suggest "generating volumetric data comprising a plurality of voxels from the interrogation to detect if the person is concealing an object" as in amended independent claim 15.

Further, and as explained above with respect to claim 1, *Yukl* only teaches or suggests the use of "generic" wire-frame human figures. (*Yukl*, col. 8, lines 62-67; col. 9, lines 1-5.) Accordingly, because the wire-frame depictions of *Yukl* are generic and not generated from data obtained from interrogation, *Yukl* does not teach or suggest "generating volumetric data comprising a plurality of voxels from the interrogation to detect if the person is concealing an object" as in amended independent claim 15.

Accordingly, neither *Sheen* nor *Yukl* teaches or suggests "generating volumetric data comprising a plurality of voxels from the interrogation to detect if the person is concealing an object" as in amended independent claim 15. Because all claim limitations are not taught or suggested by the prior art, the Examiner's § 103(a) rejection of amended independent claim 15 should be withdrawn and such action is respectfully requested. (*See* MPEP 2143.04.)

Furthermore, although the Examiner suggests that it would have been obvious to combine *Sheen* with *Yukl* to obtain the method of amended independent claim 15, *Yukl* actually teaches away from the proposed combination. (*See* MPEP 2145.X.D.2.) Moreover, the proposed combination would render the *Sheen* imaging system unsatisfactory for its intended purpose. (*See* MPEP 2143.01.)

As noted, *Sheen* describes a reconstruction algorithm for forming an image from data obtained from a section of a 360° cylindrical aperture. (*Sheen*, col. 2, lines 8-21.) *Yukl*, by contrast, distinguishes such imaging systems and explains that "imaging approaches to personnel screening tend to be invasive of a person's privacy and modesty. In other words, screening

systems that image the person's body penetrate the person's clothes and highlight the person's physical attributes, effectively undressing the person." (*Yukl*, col. 1, lines 54-57.) To avoid these privacy issues associated with imaging techniques, the systems described in *Yukl* do not perform any imaging, but rather measure the dielectric response of a subject to microwaves. Accordingly, *Yukl* not only teaches away from the imaging techniques of *Sheen*, but uses a different technique for contraband detection such that the combination of the *Yukl* arrays with the *Sheen* imaging system would render the *Sheen* system unsatisfactory for its intended purpose.

Because *Yukl* teaches away from the proposed combination and because the modification proposed by the Examiner would render the *Sheen* system unsatisfactory for its intended purpose, it would not have been obvious to combine *Sheen* with *Yukl* in the manner suggested by the Examiner. (MPEP 2143.01 and 2145.X.D.2.) The § 103(a) rejection of amended independent claim 15 should be withdrawn for this reason as well.

Dependent Claims 16-20, 33, 36, and 39-41 Are Also Allowable

The Examiner rejects dependent claims 16-20 and 36 as being obvious over *Sheen* in view of *Yukl*. (Office action at pgs. 4-5.) The Examiner also rejects claim 33 as being obvious over *Sheen* in view of *Yukl* in further view of *Lu*. (Office action at pg. 7.) The Examiner's rejections are all traversed.

Claims 16-20, 33, and 36 are dependent on amended independent claim 15 and are allowable for at least the reasons stated above with respect to claim 15. Further, claims 16-20, 33, and 36 are each independently patentable because of the unique and nonobvious features of the combinations set forth in each claim.

New dependent claims 39-41 are also dependent on amended independent claim 15 and are allowable for at least the reasons stated above with respect to claim 15. Further, claims 39-41 are each independently patentable because of the unique and nonobvious features of the combinations set forth in each claim. For example, the applied references do not teach or suggest "rendering one or more two-dimensional images from the volumetric data" as in new dependent claim 39.

Conclusion

In view of the above amendment and remarks, this application is believed to be in condition for allowance and such action is respectfully requested. If any further issues remain concerning this application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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Exhibit A

Examiner Interview Summary

Applicants thank Examiner Alsomiri for participating in a telephonic interview on March 20, 2007, and respectfully present the following summary of the substance of the interview.

During the interview, Applicants discussed U.S. Patent No. 5,859,609 ("*Sheen*") and U.S. Patent No. 6,057,761 ("*Yukl*") relative to pending independent claims 1, 8, and 15. More specifically, Applicants explained that col. 9, lines 25-60, of *Sheen* does not teach or suggest certain features recited in independent claims 1, 8 and 15.

No agreement was reached.